

# Shang-Ru Yao

Mobile: +1 (614) 961-5810

Web: [Shang-Ru Yao](#)

E-mail: [yao.995@osu.edu](mailto:yao.995@osu.edu)

Github: [Tony-Yao-Ru](#)

## Education

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Master of Science in Electrical and Computer Engineering    **The Ohio State University, Columbus, OH, USA**    *Aug. 2022-Dec. 2023*

- Focused on computer engineering, with expertise in **embedded computer system, computer architecture and design, and project management**

Master of Science in Mechanical Engineering

**Chang Gung University, Taoyuan City, Taiwan**

*Sep. 2018-Jun. 2020*

- Focused on **computational fluid dynamics and numerical analysis** on energy saving and pollutant reduction
- Publication: Dilution Effects Analysis on NO<sub>x</sub> Emissions of Opposed-Jet H<sub>2</sub>/CO Syngas Diffusion Flames, *International Journal of Hydrogen Energy*, Apr. 2022. (First author)

## Skills

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- **Programming language:** Java, Python, HTML, CSS, JavaScript, MySQL, C, C++, MATLAB
  - **Framework:** React.js, Android development, React Native, PyQt, Arduino programming
  - **Tool:** Linux, QT creator, Git, GitLab, XAMPP, MATLAB Simulink, Wireshark, Arduino, Ansys Fluent, Ansys Icepack

## Work Experiences

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**Software Developer (Research Student Assistant), NSF NeXUS (The Ohio State University)**

*Nov. 2022-Present*

- Integrated multiple drivers to create a seamless motor control system, enabling the configuration of multiple motors for an elaborate laser experiment setup
- Implemented multithreading to enable parallel execution of motors for the enhancement of the motor program efficiency, resulting in a significant 30% reduction in execution time per cycle
- Developed a seamless motor control system by leveraging Python APIs like PySerial and Python Library such as Copy, enabling instantaneous and simultaneous control of multiple motors
- Designed a GUI interface utilizing QT Creator to eliminate the dependence on individual driver-provided UIs, which reduced CPU and memory workload and enhanced the convenience of performing experiments

## Projects

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**Follow-Me-Carrier** | Java, C++, Android development, Arduino programming

- Designed a hands-free follow-me-carrier, leveraging a Bluetooth module (HC\_05) and the built-in gyroscope sensor in the mobile device, to achieve automatic user tracking and cost savings by eliminating the need for additional sensors in the carrier
- Implemented distance calculation between the user and the carrier using the Bluetooth GATT API in Android platform, leveraging Bluetooth RSSI to enable the follow-me-carrier to dynamically respond in various situations
- Established seamless communication between a mobile device and an Arduino using Bluetooth APIs, enabling users to control the carrier without the need for any additional portable devices

**Website Development** | HTML, CSS, PHP, JavaScript

- Configured the website environment using the XAMPP package on the Windows operating system, facilitating rapid website setup and functional verification
- Developed a communication and messaging platform for students to enable them to connect and leave messages regardless of their location, which established a thriving community
- Launched the website to the public by applying for the domain name and configuring it to point to the local internet, which significantly enhanced online visibility

**Android APP development** | Java, Android development

- Developed GUI interface for Android mobile devices, enabling users to assess three key sensors - accelerometer, gyroscope, and proximity, to demonstrate the functionality and mechanism of these sensors in mobile devices
- Implemented Bluetooth connectivity using Bluetooth APIs, facilitating seamless data transfer between two mobile devices, to carry out efficient communication and streamlined data exchange between devices
- Investigated thread interaction in mobile devices through the use of Concurrent APIs, analyzing the competitive nature of threads to gain valuable insights into mobile development's intricate thread management and synchronization aspects

**Design of the machine instruction** | Simulator

- Implemented a comprehensive simulation of microinstructions for various instruction types, including 8 single-operand instructions across 7 addressing modes, 6 double-operand instructions, 3 special instructions, and the functionality of condition codes
- Designed the register transfers to implement a set of instructions as well as the complete control unit specifications for a complete instruction set given the hardware paths
- Designed the machine instructions to test the functions of the designed complete control unit and arithmetic logic unit